

Installation, Operation and Maintenance Instructions

A large graphic consisting of a vertical grey bar on the left and a black rectangle on the right. The text "SUMPDOC™" is centered in white within the black rectangle.

SUMPDOC™

ERIEZ WORLD HEADQUARTERS: 2200 ASBURY ROAD, ERIE, PA 16506-1402 U.S.A.
WORLD AUTHORITY IN SEPARATION TECHNOLOGIES

hopper. The basket is then lowered further while tipping the basket with the handle on the bottom of the basket.

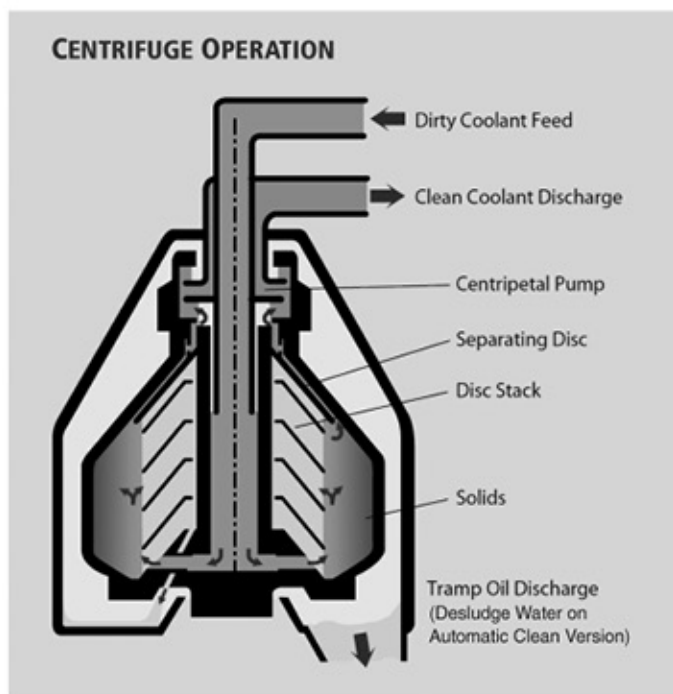
CONVENIENCE FEATURES

- Swing-bolt basket lids make lid removal and replacement easy and fast.
- “Smooth 90°” filter basket suction inlet virtually eliminates suction hose “chip jams”.
- The electronic protection (IFM Effector Proximity Switch) assembly eliminates motor damage and coolant spills by shutting off the motor when the tank is full.
- Foot operated brakes on casters

High Speed Centrifuge

The SumpDoc has been fitted with a Westfalia Model OTC-2-03-137 (OSD 2 - automatic clean version) high speed liquid centrifuge. It is designed to remove a small quantity of light phase material (tramp oils) from the flow of heavy phase coolant.

As shown in the diagram below, the high speed centrifuge operates to continuously process up to 1.5 gpm of metalworking coolant. Fine solids that accumulate are deposited on a removable sludge liner inside the bowl to be removed, cleaned and reinstalled periodically on the manual clean version.



The OSD-2 Automatic cleaning centrifuge backwashes or desludges periodically with the use of the shop water supply connected to the unit. The desludge water and fines discharge into the tramp oil/desludge container.

The tramp oil discharge from the centrifuge will flow by gravity to a collection tank located on-board the SumpDoc. The tank level is continuously monitored on the HMI touch screen controls. In addition, the tank is equipped with a submersible pump for transferring the liquid to a 55-gallon drum or other storage container.

Treated coolant is pumped back to the machine tool sump by the centripetal pump for a closed loop continuous cleaning of the sump coolant. Given sufficient time to circulate on the machine tool sump, the final tramp oil level may be reduced to as low as 0.5% by volume.

Electrical Controls

The SumpDoc electrical controls require 115-volt, 60 cycle, 20-amp, single phase service.

The controls include an HMI Touch Screen for operating the SumpDoc through the two sump cleaning phases. In addition there is a red “Emergency” stop button and control power light.

The electrical controls include a through-the-door rotary fused disconnect, a Allen-Bradley PLC, control transformer, and VFD Inverter for operating the high speed tramp oil centrifuge. A twenty foot SO power cord has been provided with a 20-amp rated plug for easy connection to customer power supply.

NOTE: SEE ELECTRICAL SCHEMATICS LOCATED IN THE CONTROL PANEL OF THE SUMPDOC

SumpDoc Alarms

The following alarms are part of the electrical controls of the SumpDoc and will be displayed on the HMI Touch Screen panel:

1. High Fluid Level Sump Cleaner – automatically shut down cleaner for 30 seconds & restart
2. High Tramp Oil/Desludge Water Level in Storage Tank – automatically shut down system



3. Low Air pressure alarm – automatically shut down SumpDoc
4. Bag Filter Clogged – pressure switch will sound alarm for bag filter change
5. Water Pressure Alarm – automatically shut down SumpDoc (automatic clean centrifuge version)
6. No Flow Alarm – automatically shut down SumpDoc (automatic clean centrifuge version)
4. Immediately clean up any spilled coolant to avoid slippery floors and dangerous falls.
5. If it is necessary to use the SumpDoc in an aisle or other traffic area, position it to minimize the likelihood of being struck by trucks, forklifts or other equipment in transit. Exercise a reasonable lookout for such hazards during operation.

Safety Considerations

NOTE: TO AVOID PERSONAL INJURY, BEFORE OPERATING A 115 VOLT ELECTRICALLY POWERED SumpDoc, THE CUSTOMER MUST CONNECT THE 3-WIRE ELECTRICAL CORD TO A SUITABLE POWER SUPPLY THAT IS ALSO PROPERLY GROUNDED. THE GREEN WIRE IN THE ELECTRICAL BOX OF THE SumpDoc IS THE GROUND WIRE. THE CUSTOMER'S GROUND SOURCE MUST BE IN ACCORDANCE WITH ARTICLE 250 OF THE NATIONAL ELECTRIC CODE (NEC) OR OTHER SUITABLE REGULATION IF IN A COUNTRY OTHER THAN THE UNITED STATES OF AMERICA.

To avoid possible injury, before operating this SumpDoc, read this manual for full operating instructions.

1. Always engage the foot brake on casters, as well as block the wheels of the SumpDoc to prevent unintentional rolling. Accidental rolling on a sloped floor, if bumped, could cause injury or property damage.
2. Wear eye goggles to protect your eyes from splashing liquids. This is important, even when you know the fluids themselves are not caustic or otherwise harmful. Metal particles suspended in the liquid could still cause serious eye injury.
3. Check hose, nozzle, cleaning tool, and hose cap connections for leaks. To minimize chances of spilling, handle cleaning tools and hoses carefully during operation, and replace hoses before deterioration results in leaks.
6. Whenever removing or reseating the filter basket (maximum chip/sludge capacity is approximately 300 lbs or 136 kg), keep hands and fingers out from under the basket lip.
7. Keep clear from beneath the basket when trying to empty its contents, or if necessary, to pull out the polypropylene liner. Use tools of appropriate strength and length to let you perform these operations safely.
8. To avoid possible injury, read all manuals for full operating procedures before attempting operation of the SumpDoc sump cleaner, or high speed centrifuge.

⚠ CAUTION: ALL COMPONENTS USED TO LIFT THE BASKET (STEEL CABLE, HOOKS, CRANE, ETC.) MUST HAVE A MINIMUM CAPACITY OF 1,000 POUNDS (455 KG).

9. DO NOT use this unit for solvents, flammable (low flash point) or other volatile liquids. Use only for water-soluble coolants.
10. DO NOT operate the high speed centrifuge unit without the centrifuge bowl properly assembled and the hood securely mounted in place.
11. This unit is to be operated and maintained by authorized personnel only.

General Operation

To validate the equipment warranty, an Eriez Service Technician must start up the SumpDoc for the first time. This ensures proper operation of the equipment and complete training of your operators.

⚠ CAUTION: DO NOT TRY TO RECYCLE RANCID COOLANT. RANCID COOLANT CANNOT BE RECYCLED AND WILL CAUSE CONTAMINATION OF OTHER NON-RANCID COOLANT IN THE PLANT.

The SumpDoc operator must first move the equipment into position next to machine tool sump. Position the SumpDoc as close as possible to the machine tool sump to keep aisle clear for other traffic. The SumpDoc should then have the wheels blocked into position to prevent accidental movement of the machine during coolant recycling.

Next, locate and connect the following utilities for the SumpDoc:

- Electrical receptacle, 115-volt, single phase, 20-amp (minimum)
- Shop air
- Shop water (automatic clean centrifuge version)

Phase I - Heavy Solids Removal

With SumpDoc in position, remove suction hoses from storage area on SumpDoc. The two hose sections have been equipped with easy cam-loc fittings to connect together. Connect hose to the top of the Sump Cleaner and lock hose into position. Remove cleaning tool from the storage holster at side of SumpDoc and connect to the other end of the suction hose. Place coolant discharge hose into machine tool sump and secure with magnetic clip (provided). Be sure hose is securely in place to avoid spills.

Using the Touch Screen, select “Chip Removal” (Screen No.1) and start Sump Cleaner blower and the pump (Screen No. 2)

The Sump Cleaner has been designed for continuous discharge. By starting the air-operated diaphragm pump, coolant that is drawn into the Sump Cleaner will be automatically and continuously returned to the machine tool sump.

Using the cleaning tool, pull coolant from the bottom of the machine tool sump where chips and other solids accumulate. Move the cleaning tool to all accessible areas of the machine tool sump to ensure that the bulk of the solids have been pulled in by the Sump Cleaner.

NOTE: IF BASKET BECOMES FULL, SUCTION WILL DECREASE. IN ADDITION, THE SUMP CLEANER IS EQUIPPED WITH A HIGH LEVEL COOLANT SWITCH THAT WILL AUTOMATICALLY STOP SUMP CLEANER TO PROTECT THE BLOWER WHILE CONTINUOUSLY DISCHARGING FLUID.

As the air-operated diaphragm pump transfers coolant from the Sump Cleaner, it will also be discharging through the pleated bag filter for removal of additional fine solid particulate.

Continue to use Sump Cleaner to remove all visible solids from the sump. Once finished, return to the Touch Screen controls and stop blower and pump. Disassemble suction/cleaning hoses, returning hoses to the storage area, and the cleaning wand to the holster on the side of the SumpDoc. Be certain to drain hoses prior to storage.

Phase II - Coolant Cleaning

With the discharge hose still fixed to the sump, place the suction hose from the Air-operated diaphragm pump also into the sump and secure into position. Note: for best results, locate the clean discharge hose at opposite ends of the machine tool sump from the coolant suction (or intake).

For this second phase of the SumpDoc operation, return to the HMI Touch Screen and select “Centrifuge Cycle” from the Main Menu. As the “Centrifuge Cycle” screen appears, set the Auto Shut-off timer to the desired cleaning time, and push the green “Start” button to start cycle.

Check to ensure that the high speed centrifuge has started and is processing coolant, returning the clean coolant to the machine tool sump.

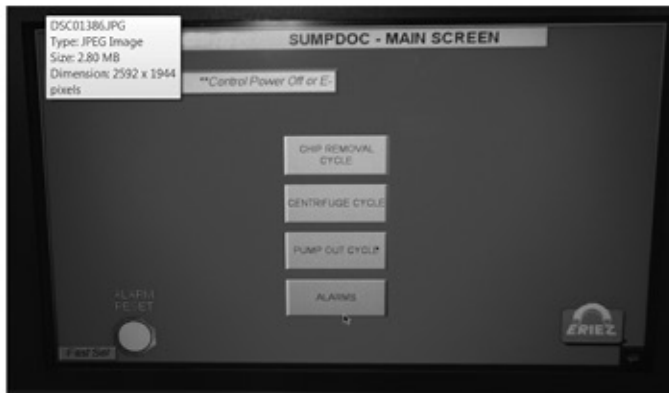


Continue to observe the automatic operation of the SumpDoc for several minutes to ensure that it is operating properly, and all flows are returning to the machine tool sump without potential spills, splashing, or overflows.

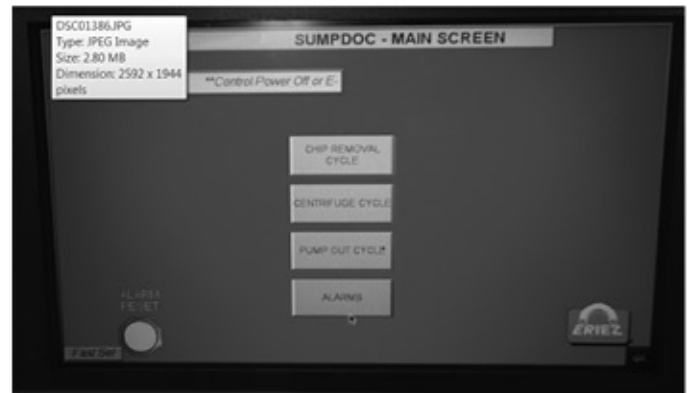
NOTE: FOR ADDITIONAL INFORMATION ON THE OPERATION OF THE WESTFALIA HIGH SPEED CENTRIFUGE, REFER TO THE GEA WESTFALIA INSTRUCTION MANUAL FOR SPECIFIC OPERATING INSTRUCTIONS

When returning to the SumpDoc, inspect the machine tool sump coolant for removal of tramp oils and solids. The coolant should appear cleaner with no visible signs of tramp oils in the sump tank.

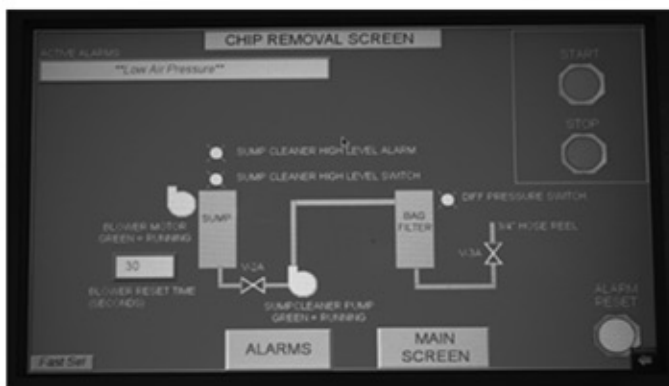
Return all suction hoses to their original locations on the SumpDoc and check level of the on-board tramp oil storage tank.



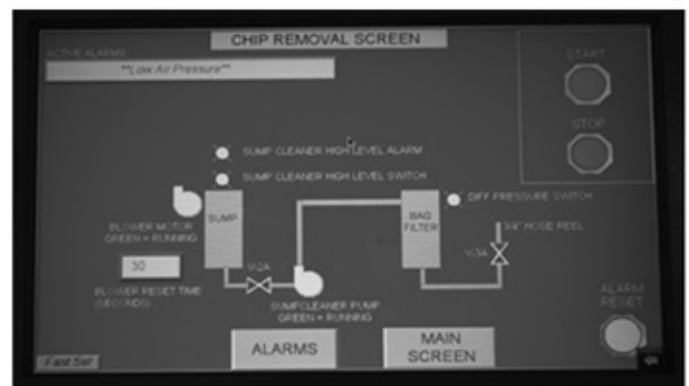
SCREEN NO. 1



MANUAL - SCREEN NO. 3



SCREEN NO. 2



SCREEN NO. 4

Routine Maintenance

Prior to each use of the SumpDoc the operator should make the following routine inspections:

- Check electrical cord for any worn or frayed areas; replace cord if found; do not attempt to repair with electrical tape.
- Check air hose for any holes or leaks; replace hose if found.
- Check the sump cleaner chip basket for solids. Be sure to start each session of the SumpDoc with a clean chip basket.
- Inspect the level of all on-board tank: tramp oil storage tank to be empty.
- Check all piping connections inside the SumpDoc. Note if there is any evidence of leaks or drips; tighten as required.
- Inspect the SumpDoc cart wheels for any cracks or surface breaks. Replacement wheels are available from Eriez.

The following are maintenance specific items for each major component of the SumpDoc:

Sump Cleaner

1. Emptying the Filter Basket
 - A. Remove lid.
 - B. Attach an OSHA approved lifting device to basket rings. CAUTION: All components used to lift the basket (steel cable, hooks, hoist, crane, etc.) must have a minimum capacity of 1,000 pounds or 455 kg.
 - C. To avoid the basket binding in the tower during removal, position the lifting power source (e.g. crane) directly over the center of the basket.
 - D. Hoist the basket. Keep hands and fingers clear. If the basket is not exiting the center of the tower, return (lower) basket to the Sump Cleaner tower. Reposition the lifting device so that the basket exits the center of the tower.
 - E. **DO NOT TOUCH BASKET DURING REMOVAL.**
 - F. Position the basket over the waste receptacle and lower until in contact with material in waste receptacle.
 - G. Tip the basket on its side and over to empty. The handle on the bottom of the chip basket can be used to assist with this effort.
2. Check the filter sleeve. If it is badly soiled or clogged, turn it inside out and wash it with a non-solvent cleaning solution. Replace filter if excessive wear or holes are found. Note: additional filter sleeves are available from Eriez.
3. Inspect the basket hoisting rings for signs of rust. Replace the basket assembly with a new one if the rings are heavily corroded.
4. Keeping hands and fingers from under the basket lip; reseal the basket in the tank and fasten down the tank lid.
5. Frequently check the basket lifting rings for signs of rust. If the rings become badly corroded, replace the basket with a new one.
6. Periodically, while the basket is out of the tank, check the tank interior for sludge buildup. If such a buildup starts to get thick, use an appropriate tool to scrape it off the tank walls. Remove the discharge hose and hose fitting from the bottom of the tank, and flush the tank with a water hose.

Westfalia High Speed Centrifuge

For specific maintenance of the Westfalia high speed centrifuge, refer to the GEA Westfalia Separator Instruction Manual included with the SumpDoc operating manual. It will be necessary to manually clean and inspect the bowl as required to ensure continued efficient operation (refer to Westfalia manual).

⚠ WARNING:

DO NOT ATTEMPT TO CLEAN OR SERVICE THE CENTRIFUGE UNLESS THE BOWL IS COMPLETELY STOPPED AND THE MAIN POWER IS SHUT OFF AND DISCONNECTED.



Sump Cleaner Maintenance Schedule

Weekly	Monthly	6 Months	12 Months	MAINTENANCE SCHEDULE FOR ELECTRIC SUMP CLEANERS	MAINTENANCE LOG											
					Date placed into service: Record date of service below:											
				INSPECT SUCTION & DISCHARGE HOSES; REPLACE AS NEEDED												
				INSPECT FILTER BASKET SLEEVE; REPLACE AS NEEDED; INSPECT BASKET LIFTING RINGS FOR CORROSION												
				INSPECT TANK FOR SLUDGE BUILDUP; CLEAN AS NEEDED												
				GREASE WHEELS & CASTERS; USE NO.2 BEARING GREASE												

Cleaning Instructions for Manual Clean Centrifuge

- Follow normal Shut Down procedure.
- Make sure main power is shut off to control panel and proper lockout/tag out (LOTO) procedures are followed.
- Make sure electrical cord is disconnected.
- Make sure air supply is disconnected.
- Make sure manual feed valve is closed.
- Remove feed and discharge hoses from centrifuge hood.
- Remove hood hold-down nuts (qty-2) and one bolt
- Disassemble centrifuge bowl and clean (see centrifuge manual).
- Reassemble bowl (see centrifuge manual).

NOTE: CONTACT YOUR ERIEZ TECHNICAL SERVICE REPRESENTATIVE IF THERE ARE ANY QUESTIONS AS TO THE PERFORMANCE OF THIS WESTFALIA CENTRIFUGE CLEANING.

Filter Cleaning

Change the filter cartridge when there is a 30-35 PSI differential between the pressure gauge at the inlet side of the filter housing and the gauge on the outlet side of the filter housing.

- Follow normal Shut Down procedure.
- Make sure main power is shut off to control panel.
- Make sure main power is shut off to control panel and proper lockout/tag out (LOTO) procedures are followed.
- Make sure electrical cord is disconnected.
- Make sure air supply is disconnected.
- Make sure manual feed valve is closed.
- Drain fluid from housing via drain valve at bottom of filter housing
- Loosen top bolts and drop down to remove filter housing lid.
- Install a new clean filter cartridge in the filter housing (see enclosed manual). There will be a bronze colored valve on top of the unit. This is an air bleed valve. Turn the black bleed screw on top of the valve counterclockwise two turns.

Troubleshooting

The following troubleshooting guide is designed to provide basic guidance for recognizing simple operational or functional problems only. After reviewing these suggested items, should you continue to have performance issues with your Eriez SumpDoc, please contact the Eriez technical service department.

1. Problem – Sump Cleaner suction has dramatically decreased or stopped.

Possible Causes:

- Chip basket is full; empty chip basket.
- Suction hose has become clogged: check and clean out hose(s)
- Liquid Level too high in Sump Cleaner (liquid sensor). Wait for air pump to pump fluid from tank resulting in sump cleaner restarting.
- Blower failure; contact Eriez technical service department.

2. Problem – Low flow from SumpDoc back to machine tool sump.

Possible Causes:

- Filter housing pleated bag filter clogged; check pressure gauges and HMI touch screen for differential pressure alarm condition. Replace filter as required.
- Suction hose has become clogged: check and clean out hose(s).
- Manual ball valves closed; open and adjust to desired flow.

3. Problem: tramp oil in clean, treated effluent.

Possible Causes:

- Check centrifuge bowl assembly (see Westfalia manual).
- Be certain that feed valve to the high speed centrifuge is open.
- If tramp oil (and desludge - automatic clean centrifuge version) collection tank is full, alarm condition will be noted on the HMI touch screen and SumpDoc will automatically shut-down. Empty tank and restart cleaning process.

4. Problem: Alarm Conditions – Remedial Action Required

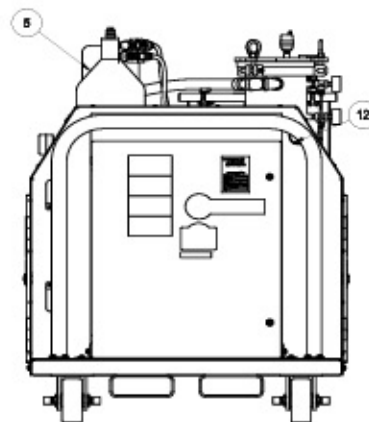
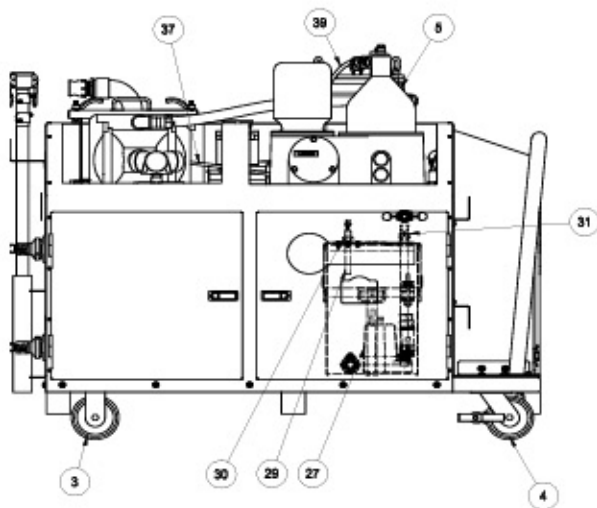
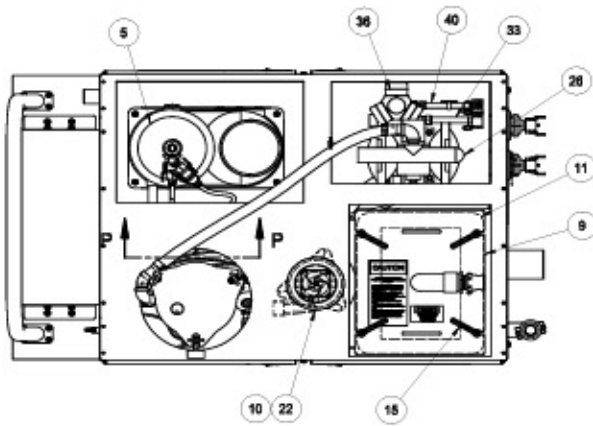
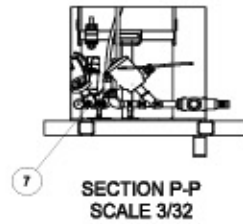
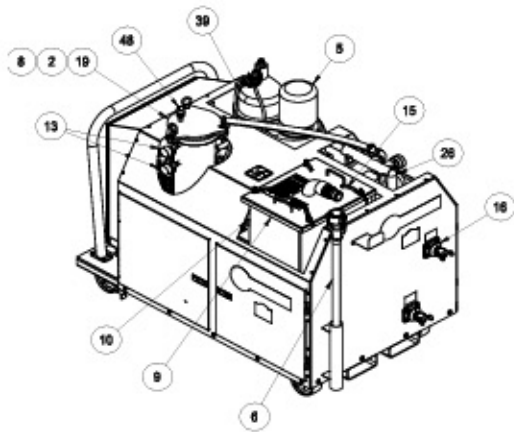
The following alarms are part of the electrical controls of the SumpDoc and will be displayed on the HMI Touch Screen panel:

1. High Fluid Level Sump Cleaner – will automatically shut down suction of sump cleaner.
Solution: Check chip basket and empty if full. Increase output of double diaphragm pump to bring level down in cleaner. See 6.0 TROUBLESHOOTING Item 1.
2. High Tramp Oil (and Desludge - automatic clean centrifuge version) Level in Storage Tank – will automatically shut down system.
Solution: pump out tramp oil storage tank to appropriate container.
3. Low Air pressure alarm – will automatically shut down SumpDoc
Solution: Check air hose fitting and compressed air source to restore air pressure to SumpDoc.
4. Bag Filter Clogged – pressure differential switch to indicate time for bag filter change
Solution: change out pleated bag filter element. See 6.0 TROUBLESHOOTING Item 2.
5. Low Water Pressure Alarm – will automatically shut down. (automatic clean centrifuge version)
6. No Flow Alarm – will automatically shut down. (automatic clean centrifuge version)

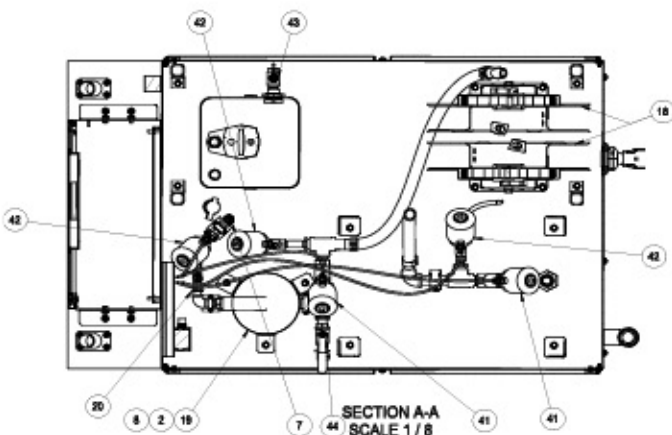
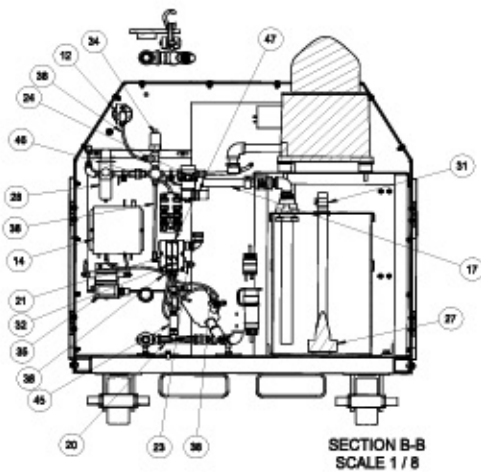
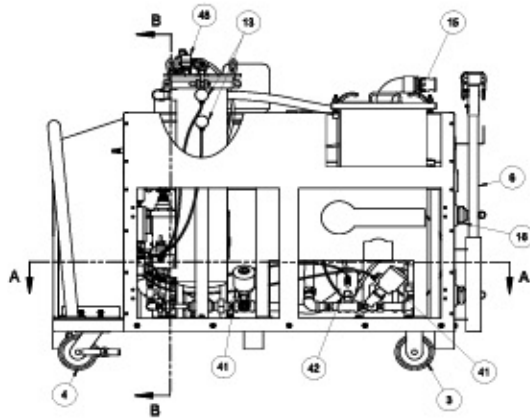
Your Eriez SumpDoc has been designed and built for years of trouble free operation. Please contact the Eriez Technical Service Department should require any assistance in the operation of your Eriez SumpDoc.



Spare Parts List - Manual Clean Centrifuge Version



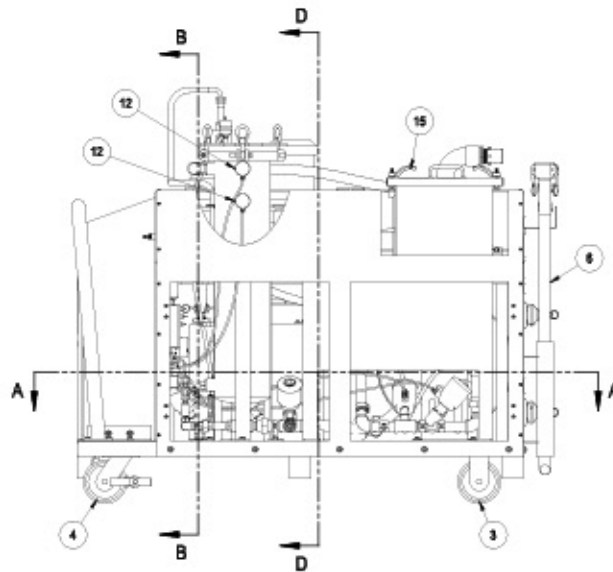
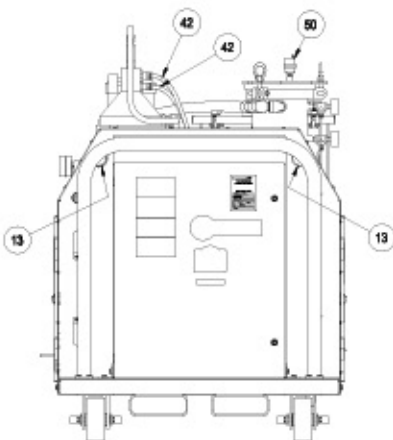
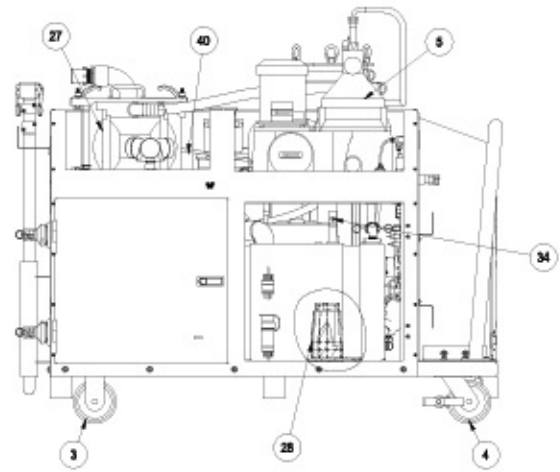
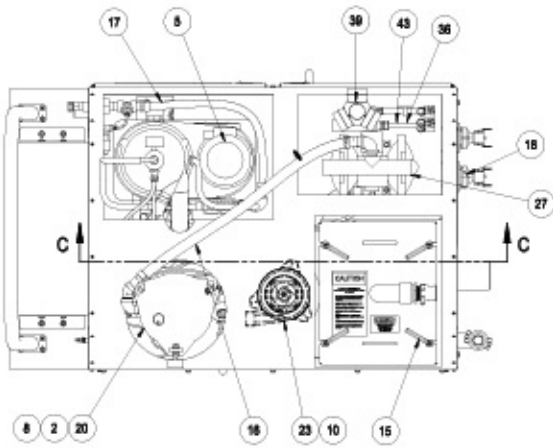
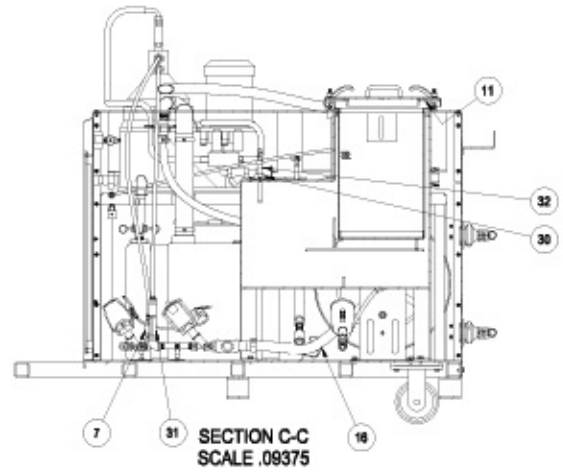
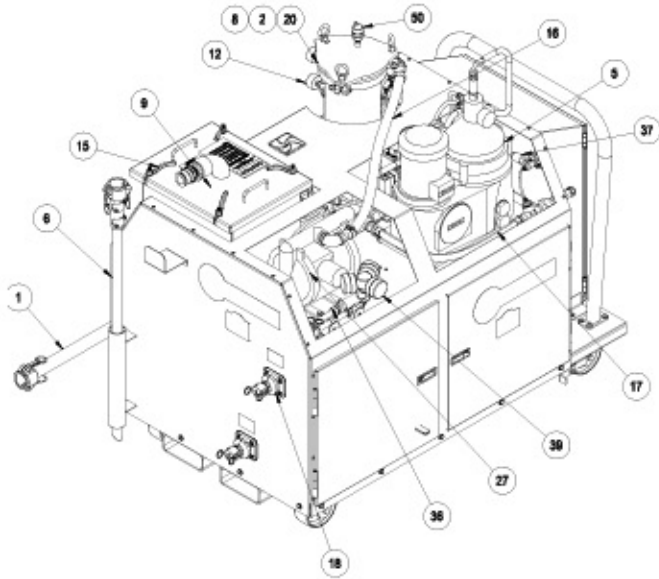
Spare Parts List - Manual (cont.)



Part #	Stock #	Description
48	60-2160	Vent Float Automatic 1/8"
47	472945	Valve Solenoid Base
46	461184	Valve Solenoid 1/4
45	460516	Valve Check 1/4 NPT
44	H.35.50252	Valve Ball 3/4"
43	460698	Valve Ball 3/4 NPT X 3/4 GHT
42	26-1050	Valve 1/2" Piston
41	26-1100	Valve 1" Piston
40	41-2190	Tubing Vinyl 1/2 ID
39	41-2430	Tubing Black Poly 1/2"
38	H.41.21000	Tubing 1/4' OD Pneum
37	H.41.21050	Tubing 1/2" OD Nylon
36	139694	Triangle Skimmer Assy.
35	472915	Switch Pressure Diff
34	H.89.50016	Switch Pressure 0-145 PSI
33	201304453G1	Suction Strainer Assy.
32	472944	Solenoid Valve 24 VDC
31	464357	Shut Off Coupling 3/4 MGHT X
30	460844	Sensor Flange Plate E
29	460843	Sensor Binary Level
28	28-1020	Regulator Air 1/4 NPT
27	460467	Pump Little Giant Model
26	56-1090	Pump Double Diaph Air 1"
25	467661	O-Ring Kit
24	413664	Muffler 3/8
23	H.41.92002	Muffler 1/4" w/Speed Control
22	52-1400	Motor Vacuum 120V Units
21	472943	Kit End Plate Solenoid Valve
20	460515	Injector Ozone Venturi
19	463013	Housing Filter
18	460374	Hose Reel w/25' 3/4" Hose
17	41-2320	Hose Braided 3/4" X 1 X 1/8"
16	460376	Hose Ball Stop 1"
15	40-1150	Handle Easy Grip
14	460348	Generator Microzone
13	472922	Gauge Press 100 PSI 2" Face
12	472956	Gauge Press 100 PSI 2" Face
11	463031	Gasket Lid
10	60-1567	Gasket Foam
9	60-1450	Filter Sleeve
8	463877	Filter Bag #2 25 Micro
7	28-1320	Control Flow 1-1/2 GPM 1/2'
6	201314081G1	Cleaning Tool 1.5 Dia Asy.
5	80-1115	Centrifuge OTC-2-03-137
4	473069	Caster Swivel
3	472469	Caster Rigid
2	460195	Basket #2 Pleated Filter Bag
1	201702704G1	1.5" Spare Hose Assy.



Spare Parts List - Automatic Clean Centrifuge Version



Introduction

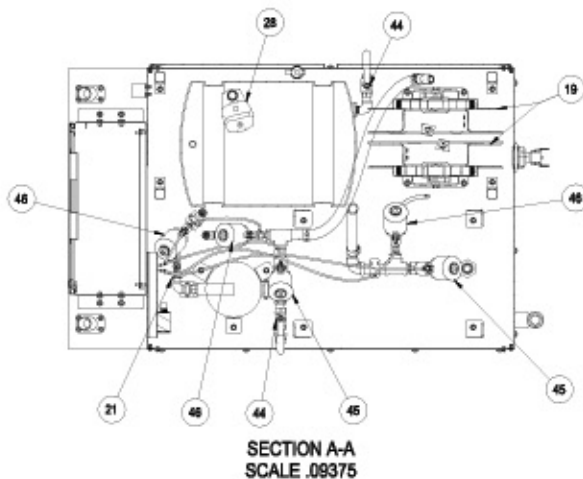
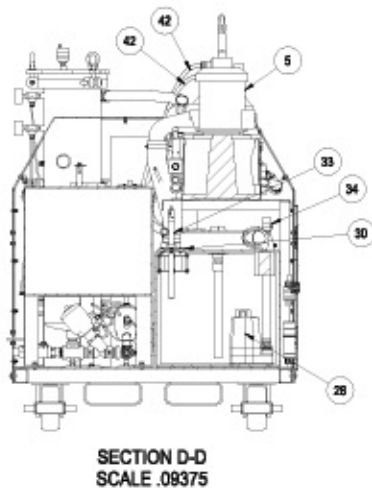
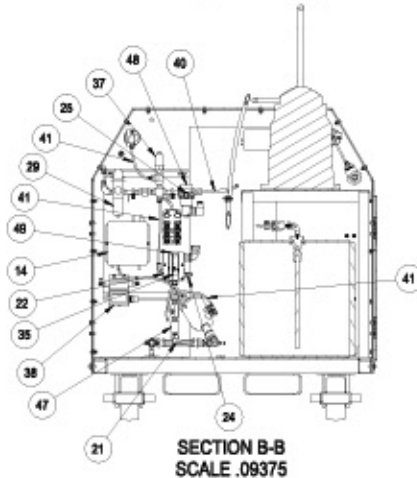
This manual details the proper steps for installing, operating and maintaining the SumpDoc™.

Careful attention to these requirements will assure the most efficient and dependable performance of this equipment.

Note: This manual covers the operation and maintenance of the SumpDoc with the manual clean centrifuge (Westfalia model OTC-2-03-137) as well as the SumpDoc with the automatic clean centrifuge (Westfalia model OSD-2). Differences in operation and maintenance are noted where applicable.

If there are any questions or comments about the manual, please call Eriez at 814-835-6000.

Spare Parts List - Automatic (cont.)



Part #	Stock #	Description
50	60-2160	Vent Float Automatic 1/8"
49	472945	Valve Solenoid Base
48	461184	Valve Solenoid 1/4
47	460516	Valve Check 1/4 NPT
46	26-1050	Valve 1/2" Piston
45	26-1100	Valve 1" Piston
44	H.35.50250	Valve Ball 3/4"
43	41-2190	Tubing Vinyl 1/2 ID
42	41-2430	Tubing Black Polyethylene 1/2"
41	H.41.21000	Tubing 1/4" OD Pneum
40	H.41.21050	Tubing 1/2" OD Nylon
39	139694	Triangle Skimmer Assy.
38	472915	Switch Pressure Diff
37	H.89.50016	Switch Pressure 0-145 PSI
36	201304453G1	Suction Strainer Assy.
35	472944	Solenoid Valve 24 VDC
34	464357	Shut Off Coupling 3/4 MGHT X
33	471811	Sensor Point Level 273 MM
32	460843	Sensor Point Level 132 MM
31	460384	Sensor Flow 1/2 NPT
30	460844	Sensor Flange Plate E
29	28-1020	Regulator Air 1/4 NPT
28	460467	Pump Little Giant Model
27	56-1090	Pump Double Diaph Air 1'
26	461288	O-Ring Kit
25	413664	Muffler 3/8
24	H.41.92002	Muffler 1/4" w/Speed Control
23	52-1400	Motor Vacuum 120V Units
22	472943	Kit End Plate Solenoid Valve
21	460515	Injector Ozone Venturi
20	463013	Housing Filter
19	460374	Hose Reel w/25' 3/4" Hose
18	460376	Hose Ball Stop 1'
17	41-2320	Hose 3/4" ID Reinforced PVC
16	41-2300	Hose 1" ID Reinforced PVC
15	40-1150	Handle Easy Grip
14	460348	Generator Microzone
13	472956	Gauge Press 100 PSI 2' Face
12	472922	Gauge Press 100 PSI 2' Face
11	463031	Gasket Lid
10	60-1567	Gasket Foam
9	60-1450	Filter Sleeve
8	463877	Filter Bag #2 25 Micro
7	28-1320	Control Flow 1-1/2 GPM 1/2"
6	201314081G1	Cleaning Tool 1.5 Dia Asy.
5	80-1135	Centrifuge OSD-2-03-137
4	473069	Caster Swivel
3	472469	Caster Rigid
2	460195	Basket #2 Pleated Filter Bag
1	201702704G1	1.5' Spare Hose Assy.

Note: Some safety warning labels or guarding may have been removed before photographing this equipment.
Eriez and Eriez Magnetics are registered trademarks of Eriez Manufacturing Co, Erie, PA

©2018 Eriez All Rights Reserved



World Authority in Separation Technologies

Headquarters: 2200 Asbury Road, Erie, PA 16506-1402 U.S.A.

Telephone: 814-835-6000 • Fax: 814-838-4960

Web Site: <http://www.eriez.com> e-mail: eriez@eriez.com

Manufacturing Facilities: AUSTRALIA • BRAZIL • CANADA • CHINA • INDIA • JAPAN • MEXICO • SOUTH AFRICA • UNITED KINGDOM • UNITED STATES



Table of Contents

SUMPDOC™

THEORY OF OPERATION.....	4
DESCRIPTION OF COMPONENTS	8
Sump Cleaner.....	9
High Speed Centrifuge	10
Electrical Controls.....	10
SAFETY CONSIDERATIONS	11
GENERAL OPERATION.....	12
Phase I - Heavy Solids Removal	12
Phase II - Coolant Recycling	13
ROUTINE MAINTENANCE	14
TROUBLESHOOTING GUIDE	16
SPARE PARTS LIST	17

Theory of Operation

The SumpDoc™ is a mobile machine, capable of locating next to a machine tool, parts washer, or rinse tank and providing full service fluid recycling. Nearly all metalworking machine tools require a fluid to provide lubrication and cooling for the metal removal operations performed. It is the water based metalworking fluids, often referred to as “coolants” with which we are concerned.

These fluids are critical to achieving proper results in the production of a variety of components. While subject to degradation through oxidation, microbial assault, and other chemical interactions, it is highly desirable to maintain these water based fluids in proper working condition, often indefinitely. In addition, there are numerous style parts-washing systems that utilize a water based cleaning solution for washing parts. Contaminates are generally oil, grease, dirt, and other particulate. Often the washer fluid is dumped and replenished due to a build-up of tramp oils and solids.

Many machine tools, especially CNC turning machines, horizontal boring machines, and others are not connected to a central or individual coolant filtration system. Instead these machines often have a chip conveyor for removal of the large chip generation with a small, low coolant sump located under the machine. Because of the lack of continuous filtration and contaminate removal, the “sump life” of these fluids is negatively impacted.

There is a wide variety of portable metalworking fluid cleaning devices used for separating solids and tramp oils from metalworking coolants. The present disadvantages of these existing devices and process include:

- Machine tool production must stop.
- Equipment requires full-time operator interface, and are labor intensive.
- Metalworking fluid and solids must be physically removed from machine tool base.
- Contaminated metalworking fluid must be transported to a remote location for recycling, processing, or disposing.

- The equipment only addresses one of the many contaminates located in the machine tool sump, such as tramp oil. Various skimmers and coalescing devices are often added to individual machine tool sumps for the removal of these tramp oil materials.
- The existing devices generally only address solids and does not address tramp oil, concentration, fluid level, or microbiological activity issues.
- In order to properly recycle the coolants in these machine tool bases, it often requires multiple pieces of fluid recycling equipment.

The goal of the SumpDoc is to address these disadvantages, and provide a complete coolant restoration and rejuvenation treatment of the metalworking fluids in the machine tool sump without stopping production or transporting fluids. In addition, the SumpDoc reduces the direct labor time and costs for attempting to recycle the metalworking fluids by providing a machine with the built-in capabilities to address large quantities of metalworking chips, contaminates, suspended solids, fine particulate, tramp oils, pseudo-emulsified materials, and microbiological contamination in a single, efficient machine.

Features and Benefits of the SumpDoc™

The SumpDoc is a portable, self-contained machine, requiring standard utilities of 115-volt, 20-amp electrical service, and compressed air (90 psig @ 40 CFM). (Shop water @ 45 psi - for automatic cleaning centrifuge version)

1. Operation of SumpDoc does not require stopping of the machine tool. All metalworking coolant processing functions to restore, and thus recycle, metalworking coolant, are accomplished while the machine tool remains in production.
2. Removal and transporting of metalworking fluid to a remote site for cleaning and rejuvenating is not required. Metalworking coolant circulates through the SumpDoc and thus remains in the machine tool sump for continuous production and operation of the machine tool.



3. SumpDoc incorporates a PLC control for automatic operation and minimal operator interface. Machine design and operation allows machine tool operator to utilize the SumpDoc on his machine tool sump while continuing production.
 4. SumpDoc removes and collects the accumulation of large quantities of metalworking chips and debris. Powerful suctioning of metalworking chips and debris to discharge into a fine-mesh polyester basket for collection is accomplished with continuous return discharge of pre-cleaned metalworking fluid to machine tool sump. This continuous return of pre-cleaned metalworking fluid to the machine tool sump also increases sump agitation and suspension of solids particulate for removal by the SumpDoc.
 5. SumpDoc is designed to remove fine solid particulate from metalworking fluid by using a pleated bag positive filtering element with continuous recirculation.
 6. SumpDoc is designed to continuously remove additional free and pseudo-emulsified tramp oils from metalworking by circulation through a high speed centrifuge. Tramp oils (total) remaining in metalworking fluid to < 1% by volume.
 7. Built into each SumpDoc is the additional capability of treating recycled metalworking fluid for microbiological contamination through injection of ozone to final clean coolant stream. Optional injection of ozone has been proven to "kill" microbial contamination in aqueous fluids.
 8. SumpDoc incorporates a collection tank for tramp oil (and desludge liquids - for automatic cleaning centrifuge version) with submersible pump for automatic transfer to designated storage tanks upon completion of machine tool coolant or parts washing fluid rejuvenation.
 9. SumpDoc electrical controls incorporate operator features including:
 - Simple 115-volt 20-amp service requirement (minimum) to allow grounded plug to appropriate power supply at machine tool.
 - "Dashboard" control design with HMI Touch Screen for ease of operator interface.
 - Continuous tank level readout for on-board storage tank.
 - Function selection from chip and solids removal to tramp oil and fine solids removal.
 - Automatic operation for minimal operator interface requirements.
 - Unloading of collected materials such as tramp oils (and desludge liquids - for automatic cleaning centrifuge version) by submersible pumps into appropriate final collection containers.
 10. SumpDoc has been designed for easy maneuvering in a plant by hand, with forklift brackets included for moving the unit any distance in the plan to transport to various machine tool sump locations throughout metalworking facility.
 11. Automatic hose reels and/or storage provided for all fluid connections to machine tool sump for ease of operation, safety, and housekeeping advantages.
 12. SumpDoc is constructed of lightweight materials, fully enclosed, for ease of mobility and operator movement of equipment from machine tool to machine tool throughout the facility.
- SumpDoc is also designed to incorporate quick connections to utility requirements for compressed air, and power for quick set-up. It contains standard industrial component construction throughout.

Description Of The Process

SumpDoc is designed to be stored in maintenance crib or other plant designated area. The operator transports the SumpDoc to the operating machine tool for fluid rejuvenation in the machine tool sump. Once the SumpDoc is in position, the automatic braking system will lock in position to secure.

The operator has to connect SumpDoc to compressed air. (Shop water also must be connected to the unit - for automatic cleaning centrifuge version.) Finally, the SumpDoc is plugged into a properly grounded 115-volt outlet 20-amp service minimum. The SumpDoc is now ready to begin fluid rejuvenation. Note: Fluid level

in sump of machine tool to be near the high level point when beginning to use the SumpDoc to avoid a low level alarm when fluid is removed for recycling. Machine tool is to remain in full production during processing of coolant.

First stage of process will require operator interface. 1-1/2 inch diameter flexible hose is to be removed from storage and attached to suction of sump cleaner. Aluminum cleaning wand is then to be attached to opposite end of flexible hose. Clean coolant discharge hose to be pulled from portable fluid recycling machine reel and dropped into the coolant sump of the machine tool. Return hose is secured by magnetic holder or other device to machine tool base/sump.

At the electrical control “dashboard”, the operator selects “Chip Removal Cycle” from main screen to begin cleaning coolant.

HMI touch screen displays portable fluid recycling machine functions. In addition, the operator will be able to view level of on-board tramp oil tank.

In this mode, the electric blower of the sump cleaner will initiate, creating the suction for the cleaning out of any large accumulation of chips and solids in the sump. Using the aluminum cleaning wand, the operator begins drawing up coolant and accumulated metalworking chips and shavings into collection basket, allowing the metalworking fluid to pass through.

Air-operated diaphragm pump will continuously pull pre-cleaned metalworking fluid from the sump cleaner and deposit back to machine tool sump via discharge hose. The operator continues the process of pulling in large quantities of solids and re-circulating on the machine tool sump until all solids have been collected in the sump cleaner basket. In addition, continuous coolant discharge will pass the coolant through a fine mesh pleated bag filter for removal of finer suspended solid particulate, discharging filtered coolant back to the machine tool sump tank. Once complete, the operator returns to the SumpDoc’s electrical control “dashboard” HMI touch screen to stop sump cleaner function. Flexible suction hose and aluminum cleaning wand are to be drained and then disassembled and returned to storage.

Phase Two of the operation only requires operator set-up. The operator inserts the hoses in the base of the machine tool sump and secures them via magnetic holder or other device. The floating triangle skimmer attachment should be connected to the end of the suction hose for use where large quantities of floating tramp oil are present in the sump. In sumps that will not allow use of the floating skimmer due to restrictions, the suction strainer should be used. With discharge and suction hoses in place, select “Centrifuge Cycle” from main screen on HMI to begin cleaning coolant.

An air operated diaphragm pump will begin pumping coolant to the cartridge element in the filter housing for continuous removal of solid particulate.

Coolant will exit the filter housing and continue to the high speed centrifuge for removal of tramp oil ultra-fine particulate. As the tramp oil is separated, it will flow automatically to the tramp oil storage tank.

Clean metalworking coolant is discharged from the centrifuge and pumped, via internal centripetal pump, back to machine tool sump.

In order to treat the metalworking fluid for microbiological growth and contamination, an ozone generator is initiated to continuously inject ozone into the clean metalworking coolant as it returns to the machine tool sump. The length of the “Auto Shut Off” time can be selected by the operator, depending on the condition of the metalworking fluid in the machine tool sump.

Once the “Centrifuge Cycle” has been set up, the operator is essentially free to conduct other activities. The HMI on the portable fluid recycling machine is equipped with an alarm banner that scrolls all active alarms. A number of conditions could result in an alarm, including:

- High Fluid Level Sump Cleaner – automatically shut down cleaner for 30 seconds & restart
- Tramp Oil/Desludge/High Level in Storage Tank – automatically shut down system
- Low Air pressure alarm – automatically shut down SumpDoc
- Bag Filter Clogged – pressure switch will sound alarm for bag filter change



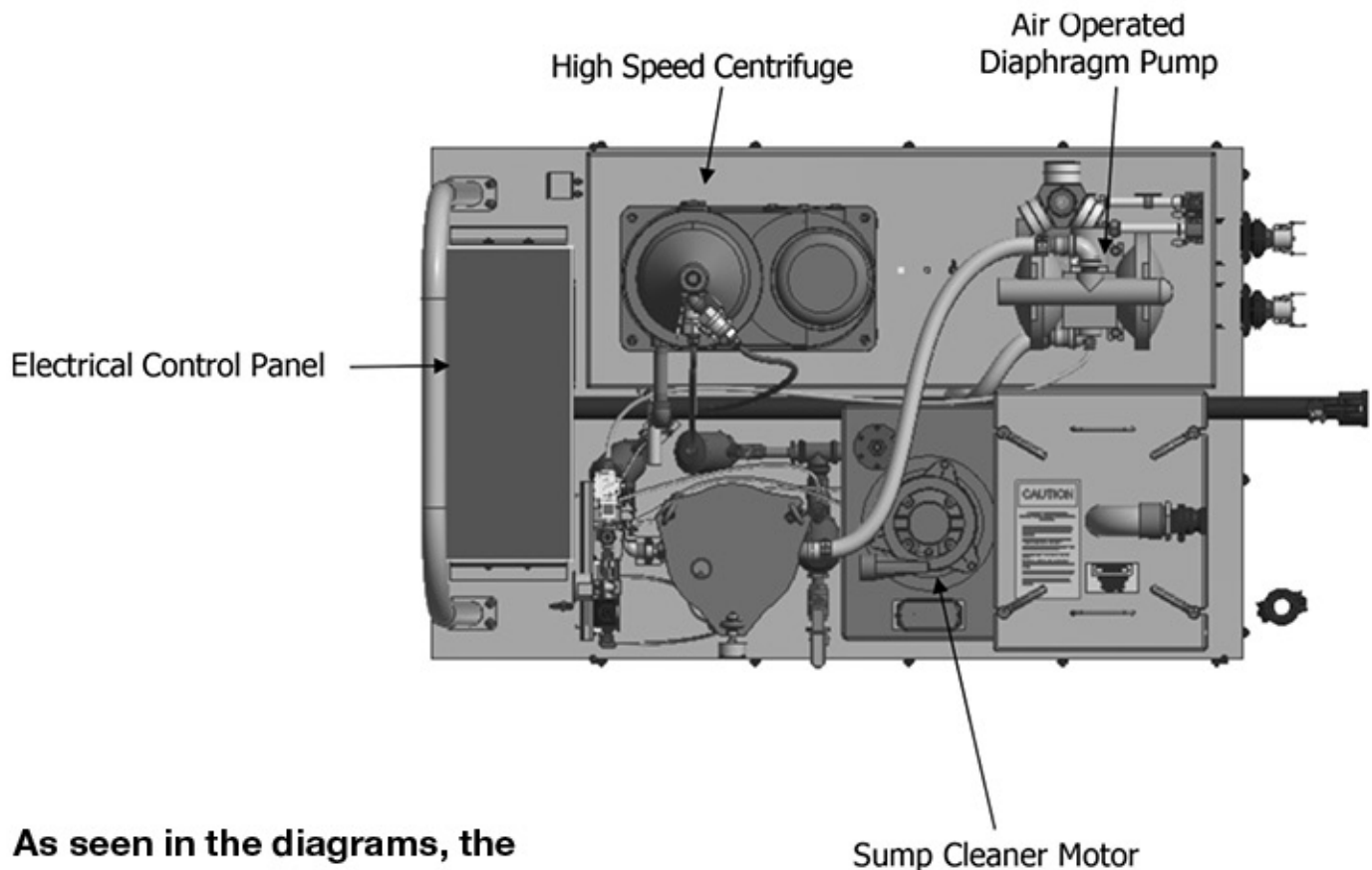
- Water Pressure Alarm – automatic shut down of SumpDoc (for automatic cleaning centrifuge version)
- No Flow Alarm – automatically shut down of SumpDoc (for automatic cleaning centrifuge version)

The operator of the SumpDoc will verify the “Centrifuge Cycle” has finished; then will return to inspect the sump. If the coolant has been cleaned of solids and tramp oil, the operator can remove hoses and move on to the next sump. If, however, in the operator’s judgment, more cleaning time is required, the operator may return to the HMI touch screen and select more clean time and options.

Once the sump tank reaches the desired cleanliness level, the operator then reels in all hoses, disconnects the power (unplug unit), disconnects the compressed air and water (for automatic cleaning centrifuge version) returning hoses to their stored positions. The SumpDoc portable fluid recycling machine is now available to move on to the next machine tool sump or parts washer for processing in a similar manner. Prior to moving forward, operator will need to check the level in the storage tank via the HMI touch screen visual display on the electrical controls “dashboard” including the inspection of the sump cleaner basket for accumulated chips and solids.

The SumpDoc can be used on a variety of different water based metalworking fluids on various materials and metalworking applications. Because the SumpDoc will have some residual coolant in the lines and filter housings coolant, the machine is limited to **single-product** machine tool sump treatment. If multiple coolant products are in use, the machine will require thorough cleaning and flushing of all hoses, pipes, and equipment to prevent cross-contamination.

The SumpDoc can also be used on standalone parts washers utilizing water miscible cleaners for the continuous treatment and removal of suspended solids, tramp oils, etc., from the washer fluid. Virtually any self-contained water based fluid cleaning system, metalworking fluid machine tool sump, rinse tank, or other where extraneous oils, suspended solids, and microbial activity shorten the fluid life and force disposal will benefit from the application of the SumpDoc.



As seen in the diagrams, the SumpDoc consists of the following main components:

- Electric operated sump cleaner.
- Standard No. 2 Filter Housing with pleated bag filter
- Westfalia Model OTC-2-03-137 High Speed Centrifuge (for manual clean version)
- Westfalia Model OSD 2 High Speed Centrifuge (for automatic clean version)
- Ozone Generator and Injector System
- Electrical Controls with HMI Touch Screen and PLC for automatic operation
- Various hoses, cleaning tools, suction heads, and utility connections

Sump Cleaner

The SumpDoc features an on-board electric sump cleaner. This cleaner is designed to be the first stage of cleaning your machine tool sumps by removing the large solids, chips, and other debris that may have accumulated in the base of the machine tool.

STANDARD SAFETY FEATURES

The Sump Cleaner is an inherently safe machine. However, it could pose the potential for hand and finger injury when the operator has to remove the filter basket from the unit and empty it of chips and sludge. For this reason, Eriez has two safety features on this machine:

- The filter basket automatically centers itself within the unit's basket support as it is being hoisted out of the machine. This eliminates the need for the operator to physically guide the heavy, chip-laden basket as it is being raised. This significantly reduces the opportunity for the operator to receive hand injury.
- The unique tipping-basket design enables the operator to empty the filter basket (the basket can hold up to 300 pounds, or 136 kg of chips) without the need for special tools. The basket is removed from the unit, positioned over a chip hopper or similar device, and then slowly lowered until in contact with the materials already in the